Refurbishment and
Museum Installation

for the

LUNAR EXCURSION MODULE SIMULATOR

NATIONAL HISTORIC LANDMARK

National Aeronautics and Space Administration
Langley Research Center
Hampton, Virginia

SCHEDULE OF

PLANNING AND APPROVALS

Attachment F
16 Pages

ATTACHMENT F

SCHEDULE OF PLANNING AND APPROVALS

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ATTACHMENT F

GENERAL:

For the planning of the LEMS refurbishment, the principle resources are the talents, skills, and expertise of people. Graphic documentation is sparce. Contractors have long since discarded engineering drawings, and much successful engineering was done on the spot without documentation. There were instances of an item being removed from the simulator, taken to the machine shop in the middle of the night, reworked, reattached, and flown before daybreak. The paper credentials of this one-of-a-kind device were not critical; its flight characteristics were.

The following samples of the planning, that has so far defined the effort, forms a cross section of the quality of the undertaking. This work includes organizational qualifications, careful scoping, attention to legal and legislative details, comprehensive recordation, expert guidance and procedures, and thorough communication of the undertaking to any interested persons and the public in general. Specialists formerly associated with the simulator have joined the Advisory Committee from retirement and serve as consultants.

The entire effort exhibits high motivation in an arena of quality publicity. Technical approvals are built in. Public law approvals are to follow.

LUNAR EXCURSION MODULE SIMULATOR RESTORATION PROJECT
1989 - 1992

THE NASA LEMS RESTORATION ADVISORY COMMITTEE

Committee Members

*Shelley Canright, OD-Office of Public Services, Bldg. 1153, x43313, MS 154

*Roger Hathaway, OD-Office of Public Services, Bldg. 1153, x43312, MS 154

Jack Smith, OSD-Fluid Systems Sec, Bldg. 1221B, x44522, MS 166A

Doug Stroupe, OSD-Metal Applications Tech Br, Bldg. 1232A, x44561, MS 387

Earl Knight, OSD-Metal Tech Dev Section, Bldg. 1232A, x44535, MS 386

Lee Person, FAD-Aircraft Opns Br, Bldg. 1244, x43915, MS 255A

Dick Layman, MSD-Remo, Bldg. 1151, x43441, MS 123

John Mouring, Facil Prog Dev Off, Bldg. 1209, x46861, MS 446

Carl Baab, Retired, LEMS Project Manager, 245-6228

Al Foley, Retired, LEMS Technician, 249-1214

Dale Gwaltney, Retired, LEMS Aerospace Technologist, 865-8852

Ray Goodman, VA Air & Sp Ctr Exhibits Curator, Bldg. 1153, x43116, MS 154

*COMMITTEE CO-CHAIRMAN

Restoration Advisory Committe Purpose

The LEMS Restoration Advisory Committee will function for two and one-half years, from September 1989 through March 1992. The purpose of the advisory committee is to:

- o determine the specifications for restoration of the LEMS to its original, non-flight condition;
- o monitor the LEMS restoration project by the NHTC;
- o provide technical advice and guidance to the NHTC faculty;
- o serve as the NASA point(s) of contact for the NHTC;
- o provide periodic updates to the Office of External Affairs and the Office of the Director regarding the project's progress;
- o meet bimonthly to review and evaluate the NHTC's restoration progress (visit NHTC site); and
- o determine any training or material needs for the NHTC.

NEW HORIZONS TECHNICAL CENTER

The New Horizons Technical Center Background

New Horizons Technical Center (NHTC) is a regional technical center that offers secondary vocational programs, advanced placement level science and technology courses, and adult apprenticeship and community interest evening courses. The NHTC has two campuses, Butler Farm Road (Hampton) and Woodside Lane (Newport News). The Butler Farm campus was built in 1985.

The Center is owned and operated by and serves a consortium of five school districts: Hampton City, Newport News City, Poquoson City, Williamsburg/James City County, and York County Public Schools. The regional school serves public school students from Gloucester, Hampton, James City County, Newport News, Poquoson, Williamsburg, and York County.

One unique aspect of the NHTC campus on Butler Farm Road is that under its roof is both the vocational education program and the governor's magnet school education program. Both of the programs operate separate from each other, yet students in both programs are given opportunities to interface and work cooperatively through assignments and learning experiences.

NASA Langley Research Center formally adopted the NHTC's Butler Farm Road campus in December 1984.

The NHTC LEMS Advisory Committee

Listed below are the NHTC administration and faculty who serve on the NHTC LEMS advisory committee. Following each name is either the position or the vocational assignment held by the individual.

Dr. Ralph Johnson, Director
Dr. Patrick Konopnicki, Principal
Mrs. Karen Strovink, Assistant Director of Student Services
Mr. Michael Butti, Metal Fabrication Instructor
Mr. Francis Chestney, Electronics Instructor
Mr. Stephen Empert, Electronics Instructor
Mr. John Riddle, Welding Instructor
Mr. Terry Smith, Auto Body Instructor
Mr. Kurt Strovink, Machine Shop Instructor
Mr. Herb Carter, Machine Shop Instructor
Mr. Harry Whitehead, Drafting Instructor
Dr. Austin Andersen, Biology Instructor/Governor's School
Mr. Leonard Klein, Chemistry Instructor/Governor's School
Mr. Richard Purman, Physics Instructor/Governor's School

LEMS RESTORATION ADVISORY COMMITTEE

New Horizons Technical Center
11:30 a.m.
September 19, 1989

Purpose

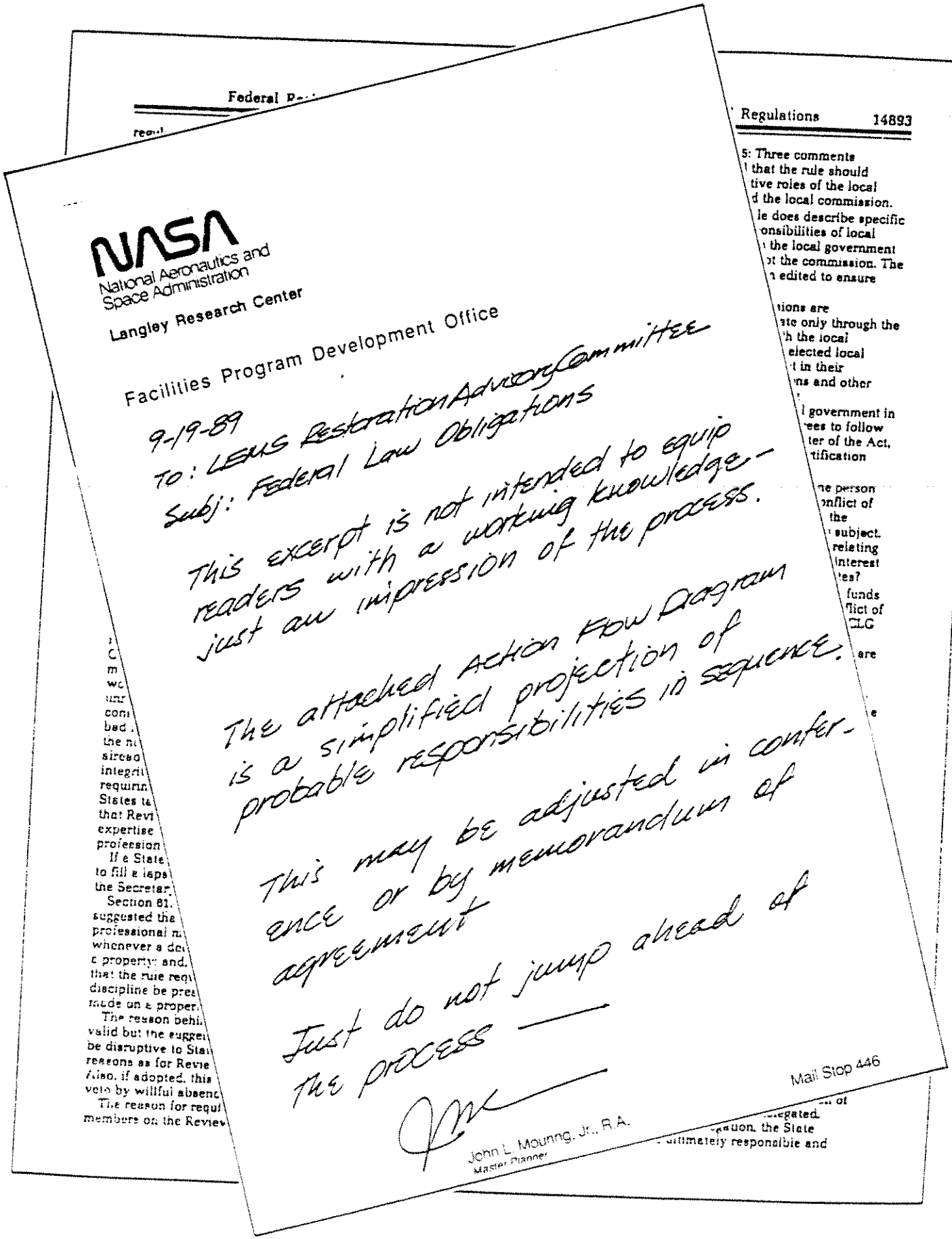
The purpose of the meeting is to: (1) meet the members of the NASA advisory committee and the New Horizons Technical Center staff, (2) visit the LEMS work area and examine the vehicle, (3) discuss the function and duties of the advisory committee, and (4) receive information regarding the four-way partnership and each partner's role in the restoration.

Committee Members

Roger Hathaway (chairman) - Bldg. 1153, Rm. 201, MS 154, x43312
Shelley Canright - Bldg. 1153, Rm. 201, MS 154, x43313
Pat Mason - Bldg. 1232A, Rm. 215, MS 387, x44575
Doug Stroupe - Bldg. 1232A, Rm. 208, MS 387, x44561
Earl Knight - Bldg. 1232A, Rm. 103B, MS 386, x44535
Lee Person - Bldg. 1244, Rm. 243, MS 255A, x43915
Dick Layman - Bldg. 1151, Rm. 116, MS 123, x43441
John Mouring (Historic Landmarks) - Bldg. 1209, Rm. 100, MS 446, x46861
Ray Goodman (VA Air & Sp Ctr) - Bldg. 1153, Rm. 214, MS 154, x43116
Carl Babbs - 959 Shore Dr., NN 23607, 245-6228

LEMS Restoration Advisory Committee Responsibilities

- to determine the specifications for restoration of the LEMS to its original, non-flight condition;
- to monitor the LEMS restoration project by the NHTC;
- to provide technical advice and guidance to the NHTC faculty;
- to serve as the NASA and Virginia Air and Space Center points of contact for the NHTC;
- to provide periodic updates to the Office of External Affairs and the Office of the Director regarding the project's progress;
- to meet bimonthly (or as determined) to review and evaluate the NHTC's restoration progress (visit the NHTC restoration site); and
- to determine any training or material needs for the NHTC.



NASA
National Aeronautics and Space Administration

Langley Research Center

Facilities Program Development Office

9-19-89

To: LEWIS Restoration Advisory Committee

Subj: Federal Law Obligations

This excerpt is not intended to equip readers with a working knowledge - just an impression of the process.

The attached Action Flow Diagram is a simplified projection of probable responsibilities in sequence.

This may be adjusted in conference or by memorandum of agreement

Just do not jump ahead of the process ——

John L. Mounng, Jr., R.A.
Master Planner

Mail Stop 446

Federal R...

Regulations 14893

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National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia
23665-5225

NASA

Reply to Attn of 154

September 5, 1989

TO: Distribution

FROM: 154/Education and Information Specialist

SUBJECT: Lunar Excursion Module Simulator Restoration Advisory Committee

I want to personally thank each of you for agreeing to serve as a member of the Lunar Excursion Module Simulator (LEMS) Restoration Advisory Committee. Each of you have been selected due to your field expertise and/or your previous work with the LEMS.

On Friday, September 15, the LEMS will be transported from Langley to the New Horizons Technical Center (NHTC) located on Butler Farm Road, in Hampton. The LEMS will be refurbished by the NHTC vocational students over a two and one-half year period. Once restored, the LEMS will be exhibited in the new Virginia Air & Space Center as a part of an exhibit on Langley's contributions to the Apollo program.

The LEMS Restoration Advisory Committee has been created to monitor the restoration and provide guidance to the NHTC refurbishing team. Participation on the committee will not be time intensive and should not exceed three hours per month. A meeting will be scheduled in the near future to discuss further the committee's function and to meet the NHTC faculty representatives.

You are invited to attend the September 15 LEMS transfer. I will contact you with the details once they have been firmed up. In the meantime, please contact me, at 864-3313, should you have any questions.

Shelley Canright

Shelley Canright
43313

Distribution

154/Roger Hathaway
387/Pat Mason
386/Earl Knight
123/Dick Layman

154/Ray Goodman
387/Doug Stroupe
255A/Lee Person
446/John Mouring

Carl Babb
959 Shore Dr.
NN, VA 23607

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NASA

Reply to Attn of
154

September 7, 1989

TO: LEMS Restoration Advisory Committee

FROM: 154/Education and Information Specialist

SUBJECT: September Committee Meeting

An advisory committee meeting has been scheduled for Tuesday, September 19, from 11:30 a.m. to 1:00 p.m., at the New Horizons Technical Center (NHTC). Lunch will be provided by the NHTC.

The purpose of the meeting is to: (1) discuss the committee's role and responsibilities, (2) meet with the NHTC faculty who will be responsible for the restoration project, (3) visit the restoration work area and examine the LEMS, (4) receive a tour of the NHTC facility and explanation on its program areas, and (5) determine the next meeting date.

As earlier indicated, the LEMS will be transported to New Horizons on Friday, September 15. The approximate time for transfer will be between 9:30 a.m. and 11:30 a.m. Presently, the LEMS is outside the hangar annex (Bldg. 1244) on the grass area. You are welcomed to visit the area and examine the LEMS before its move.

Please contact me by Friday, September 15 if you are unable to attend the committee meeting at New Horizons.

Shelley Canright

Shelley Canright
43313

LEMS MEETING NOTES
January 18, 1990

Attendance:

Doug Stroupe	Earl Knight
Leonard Klein	Francis Chestney
Tom Prothro	Ray Goodman
Dale Gwaltney	Ralph Johnson
Terry Smith	Harry Whitehead
Patrick Konopnicki	Karen Strovink
Roger Hathaway	Shelley Canright

- The meeting was called to order by the Co-Chairperson.

- Ralph Johnson gave a brief updated on the return of the LEMS from Craft Machine Company. It was noted that Craft did a excellent job blasting the LEMS. They also returned the LEMS is a timely manner. Terry Smith and several students sprayed the LEMS with a special coating to prevent rusting.

- John Mouring gave remarks and guidelines on the technical preservation documentation required by the State and National Historic Preservation Societies.

- Technical Subcommittee's gave written an oral reports.

  - Publicity Subcommittee reported on the coverage of LEMS in the local papers (Craft Machine Company). The LEMS note books are being prepared for distribution. Lee Person will speak at NHTC on 2/23/90.

  - Mechanical Subcommittee met on January 9, 1990 and turned in a written report.

  - Design and Spec. Subcommittee did not meet because of the weather, however there were several individual meeting with key personnel. A report was not submitted.

- The next meeting date was scheduled for Feb. 28, 1990 at 10:30 at NHTC.

- The meeting was adjourned.

LEMS Committee -- Design and Specifications Subcommittee

REPORT -- February 28, 1990

The first meeting of the Design and Specifications Subcommittee was held on January 23.

- Jack Smith mentioned a "Facility Resume," which would have a large amount of information about the artifact. To date, a copy of this package has not been located.

- Goals established included a Milestone Chart and a Work Order Form, both to be developed by NHTC. The form would describe each task to be worked on the artifact as a way of documenting the historical accuracy of the LEMS. The Milestone Chart would provide an overall timeline for the effort, as well as tracking the individual tasks as they are performed. The chart would have room to include the work done by specific classes at NHTC.

- A target completion date for the restoration work was established. The target date is June 1, 1991. Delivery of the LEMS to the Virginia Air and Space Center could occur as early as August 1, 1991, based on the construction schedule for the building.

A second meeting was held on February 21. At this time, draft editions of the Milestone Chart and the Work Order Form were reviewed. A copy of the list of NASA drawings concerning the facility where the LEMS was used was presented. Copies of available drawings related to the LEMS were obtained by Jack Smith and presented at a meeting of the Mechancial Subcommittee on February 12.

Order # _____

NASA/NHTC LEMS PROJECT
WORK ORDER FORM

DATE: _____

TASK DESCRIPTION: _____

_____

_____

_____

COMMENTS: _____

_____

_____

_____

PARTS REPLACED: _____

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PARTS REMOVED: _____

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STUDENT SIGNATURE:

_____	_____ Class	_____	_____ Class
_____	_____ Class	_____	_____ Class
_____	_____ Class	_____	_____ Class

_____
Teacher/Supervisor

_____
Completion Signature/NASA Representative

klw
2-21-90

NHTC Exhibit - Text and Graphics

overhead panel - transparent
Graphic: (line drawing of LEMS vehicle)
Title: Lunar Excursion Module Simulator

(NOTE: The following text and photographs are duplicated on both the front and back face of the base unit)

Main Title: Partners in Preservation

Main Text: Education, technology and history come together in the restoration of the Lunar Excursion Module Simulator (LEMS). Built at the Langley Research Center, LEMS is being restored by students at the New Horizons Technical Center (NHTC) for display in the Virginia Air and Space Center.

Photo: LEMS in use

The LEMS was built for Project Apollo, to allow astronauts to practice landing on the moon. Each of the twelve men who walked on the moon, and others including Langley test pilots, flew the vehicle.

Photo: Delivery to NHTC

With the end of Project Apollo, the LEMS was retired. In 1986, it was designated as a national (historic) landmark. The artifact was taken to the New Horizons Technical Center for restoration in 1989.

Photo: students w/ mentor

As part of a NASA-wide adopt-a-school program, in 1984 Langley Research Center reached an agreement with the NHTC. The agreement allows New Horizons students to work with Langley scientists, engineers and technicians.

Photo: VASC bldg.

The Virginia Air and Space Center is a new educational and cultural facility being developed by the City of Hampton. Scheduled to open in April 1992, the Center will feature regional history and aerospace technology together under the theme "From the Sea to the Stars."

(NOTE: The following text and photographs are each shown on one end of the base unit)

Text:
end panel
photos TBD

The LEMS restoration effort provides students with a challenging experience working with actual aerospace hardware. Langley personnel will provide technical guidance and produce some components for the restoration. The effort would not be possible without the work of individuals at Langley and at New Horizons.

Langley LEMS Restoration Advisory Committee

Shelley Canright	Dick Layman
Roger Hathaway	John Mouring
Pat Mason	Carl Babb
Doug Stroupe	Al Foley
Earl Knight	Dale Gwaltney
Lee Person	Ray Goodman

New Horizons LEMS Restoration Advisory Committee

Ralph Johnson	Kurt Strovink
Pat Konopnicki	Herb Carter
Michael Butti	Harry Whitehead
Francis Chestney	Austin Anderson
Stephen Empert	Leonard Klein
John Riddle	Richard Purman
Terry Smith	Karen Strovink

Photos:
end panel
text TBD

(representative shots showing work in progress, up to three pictures)

approval _____ date _____

approval _____ date _____

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Lunar Excursion Module Simulator
Partners In Preservation

NASA

L-89-11472